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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
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WU, JINGGE

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

/  <b>Office Action Summary</b>	<b>Application No.</b> 09/676,523	<b>Applicant(s)</b> KEROFSKY, LOUIS JOSEPH	
	<b>Examiner</b> Jingge Wu	<b>Art Unit</b> 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.  
2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-31 and 36-40 is/are pending in the application.  
4a) Of the above claim(s) 36-40 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☐ Claim(s) 1,3-15,17-26 and 28-31 is/are rejected.  
7) ☐ Claim(s) 16 and 27 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

***Response to Amendment***

Applicant's amendment filed on May 23, 2005 has been entered and made of record.

Applicants' amendment has required new grounds of rejection. New grounds rejection are therefore presented in the Office Action.

Applicant's arguments with respect to claims 1, 3-20 have been fully considered but are moot in view of the new ground(s) of rejection. The Examiner would like to point out that 1) as to claim 20, Nenonen discloses that a histogram has all pixel levels of the image and a processed histogram such as a filtered histogram can be a target histogram as claimed. The bins of the histogram are formed or delivered when the histogram are gathered by the histogram gathering (fig. 3, 10). In addition, the mapping function is generated/formed on the basis of target of programs (processed histograms) and the bins (abstract). Finally, Nenonen teaches that re-mapping (redistribution) based on the threshold that is the cut-off value (abstract). Therefore, Nenonen teaches all limitations of claim 21. Similarly, Nenonen teaches all limitations of claims 22, 24-27, and 30.

Newly submitted claims 36-40 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 36-40 include the limitations of the pixel threshold is set independently of the number of occurrences of the pixel values within the input video frame, which is different and

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distinct from originally claimed invention that the threshold is dependent (a percentage of number of pixels) on the occurrences of the pixels in the image.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 36-40 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in-

- (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
- (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

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Claims 21-22, 24-25, 30 are rejected under 35 U.S.C. 102(e) as being anticipated by US 6148103 to Nenonen (a reference of record).

As to claim 21, Nenonen discloses a video contrast enhancer (abstract) comprising:

a contrast-enhancing function generator (fig. 3) capable of accepting a target histogram (processed histogram) specification and a set of histogram bins (after cut-off) delivered from one or more frames of a video sequence (abstract), the bins (fig. 4) representing a histogram at least for pixel levels below a selected pixel level threshold (predetermined limits/cut-off values), the function generator capable of generating a remapping function (redistribution) for input pixel levels below the threshold based on the target histogram specification and the set of histogram bins (abstract, not that the function generated inherently based on the processed histogram and the bins to redistribute the pixels) ; and

a scene-stable mapper to control the remapping function for input pixel levels above the threshold (fig. 3 and 7, col. 4 line 57-col. 5 line 40 and col. 7 lines 1-28).

As to claim 22, Nenonen further discloses a pixel remapper (redistribution) capable of accepting a pixel level from input video frame and output a corresponding remapped pixel level according to the remapping function (abstract, col. 2 line 49-col. 3 line 42).

As to claim 24, Nenonen further discloses a histogram calculator (abstract, fig. 3, 10).

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As to claim 25, Nenonen further discloses the bins of the frame histogram are supplied to the contrast-enhancing function a the set of the histogram (fig. 3, 10).

As to claim 26, Nenonen further discloses a temporal filter (fig. 3, element 14, filtering sequence of frames) to supply the set of bins for using by the contrast-enhancing function generator (fig. 3, element 16), each bin comprising an exponentially time-filtered combination of sequential frame histograms from the histogram calculator (fig. 3 element 10) (fig. 5, col. 5 line 61-col. 6 line 51)

As to claim 30, Nenonen further discloses

a histogram calculator capable of constructing a frame histogram for an input video frame (fig. 3, 12);

a frame buffer (10) capable of buffering an input video frame until a remapping function can be calculated for that frame; ( fig. 3) and

a pixel remapper (16) capable of accepting a pixel level from the buffered input video frame and outputting a corresponding remapped pixel level according to the remapping function (fig. 3).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 1, 6-13, 15, 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nenonen in view of US 4742557 to Ma.

As to claim 1, Nenonen discloses a method of video contrast enhancement (abstract) comprising:

setting a first pixel level threshold for an input video frame in a video sequence (abstract, col. 5 lines 1-5);

when a given input-video-frame pixel's level is below the pixel level threshold, remapping that pixel according to an adaptive contrast-enhancing function (fig. 3 and 7, col. 4 line 57-col. 5 line 29 and col. 7 lines 1-28) ; and

when the given input-video-frame pixel's level is above the pixel level threshold, remapping that pixel according to a scene-stable mapping function (do not equalize) (fig. 3 and 7, col. 4 line 57-col. 5 line 40 and col. 7 lines 1-28).

Nenonen does not teach that setting a threshold as one of the pixel values within the pixels range that are corresponding to a plurality pixel, which is well known in the art.

Ma, in an analogous environment, discloses the limitation of setting a threshold ( $T_p$ ) as one of the pixel values within the pixels range (0-255g) that are corresponding to a plurality of pixels (figs. 4-5, col. 4 lines 35-43, col. 5 lines 11-18)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the scheme of selecting adaptive threshold of Ma in the method of Nenonen in order to obtain more informative group of signals for data processing purpose (Ma, col. 5 lines 18-19).

As to claim 6, Nenonen further discloses the method of claim 1, wherein setting a first pixel level threshold comprises setting the threshold to a fixed level for at least the duration of a scene (col. 5 lines 1-5).

As to claims 7-8, and 12-13, Nenonen further discloses the method of claim 1, further comprising calculating the adaptive contrast-enhancing function to remap an input histogram of every frame for pixels below the pixel level threshold to a new histogram specification that the new histogram specification is a uniform distribution (fig. 3 and 7, col. 4 line 57-col. 5 line 40 and col. 7 lines 1-28).

As to claims 9-10, Nenonen further discloses the method of claim 7, further comprising tabulating the input histogram from the pixels of one or more previous input video frames in the video sequence (abstract, col. 4 lines 13-56).

As to claim 11, Nenonen further discloses wherein tabulating the input histogram comprises maintaining each bin of the input histogram by exponentially time-filtering a corresponding bin as calculated for sequential frame histograms, each frame histogram representing one frame in the video sequence (col. 5 line 39-col. 6 line 51).

As to claim 15, Nenonen further discloses the method of claim 1, further comprising detecting substantial changes in scene histogram content from one frame of the video sequence to a following frame (abstract).



As to claims 19-20, the claims are the corresponding apparatus claims to claims 1 and 7 respectively. The discussion are addressed with regard to claims 1 and 7.

Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nenonen and Ma in view of US 6664973 to Iwamoto et al.

As to claim 4, the combination Nenonen and Fujimura does not explicitly mention the threshold is set by selecting percentage of the input video frames pixels.

Iwamoto, in an analogous environment, discloses a threshold is set equal to a predetermined (selected) percentage of certain pixels of the image (col. 9 lines 52+).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the scheme of selecting adaptive threshold of Iwamoto in the method of Nenonen in order to better eliminate the noise of the image (Iwamoto, col. 2 lines 4-32).

As to claim 5, Nenonen further discloses the threshold is estimated from pixel values obtained from the video input frames (abstract).

Claims 3, 14, 17-18, 23, 28-29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nenonen and Ma in view of US 5808697 to Fujimura et al.

As to claim 3, Nenonen and Ma does not explicitly mention setting another threshold.

Fujimura, in an analogous environment, discloses setting a second pixel level threshold (Y3) for an input video frame, the second threshold higher than the first (Y1) (fig. 16 a and B); and

when a given input-video-frame pixel's level is above the second pixel level threshold, remapping that pixel to a new level according to a second adaptive contrast-enhancing function (col. 12 lines 29-51).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the scheme of Fujimura in the method of Nenonen in order to obtain better video frame contrast through histogram equalization (Fujimura, col. 1).

As to claim 14, Fujimura further discloses the method of claim 1, wherein remapping for pixels both below and above the first pixel level threshold comprises using a pixel's level as an index to read a value from a common lookup table that combines the adaptive contrast-enhancing function and the scene-stable remapping function (fig. 22, col. 3 lines 50-51).

As to claims 17-18, Fujimura further discloses the method of claim 15, further comprising, when a substantial change in scene content is detected, allowing the scene-stable remapping linear function to change substantially (fig. 3a-b, col. 6 lines 18-64).

As to claims 23, 28-29, and 31, Every corresponding elements are addressed with regard to claims 3-4, 14 and 17-18.

***Allowable Subject Matter***

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Claims 16, 27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### **Contact Information**

Any inquiry concerning this communication or earlier communications should be directed to Jingge Wu whose telephone number is (571) 272-7429. He can normally be reached Monday through Thursday from 8:00 am to 4:30 pm. The examiner can be also reached on second alternate Fridays.

Any inquiry of a general nature or relating to the status of this application should be directed to TC customer service whose telephone number is (571) 272-2600.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Amelia Au, can be reached at (571) 272-7414.

The Working Group Fax number is (571) 273-8300.

Jingge Wu

Primary Patent Examiner

